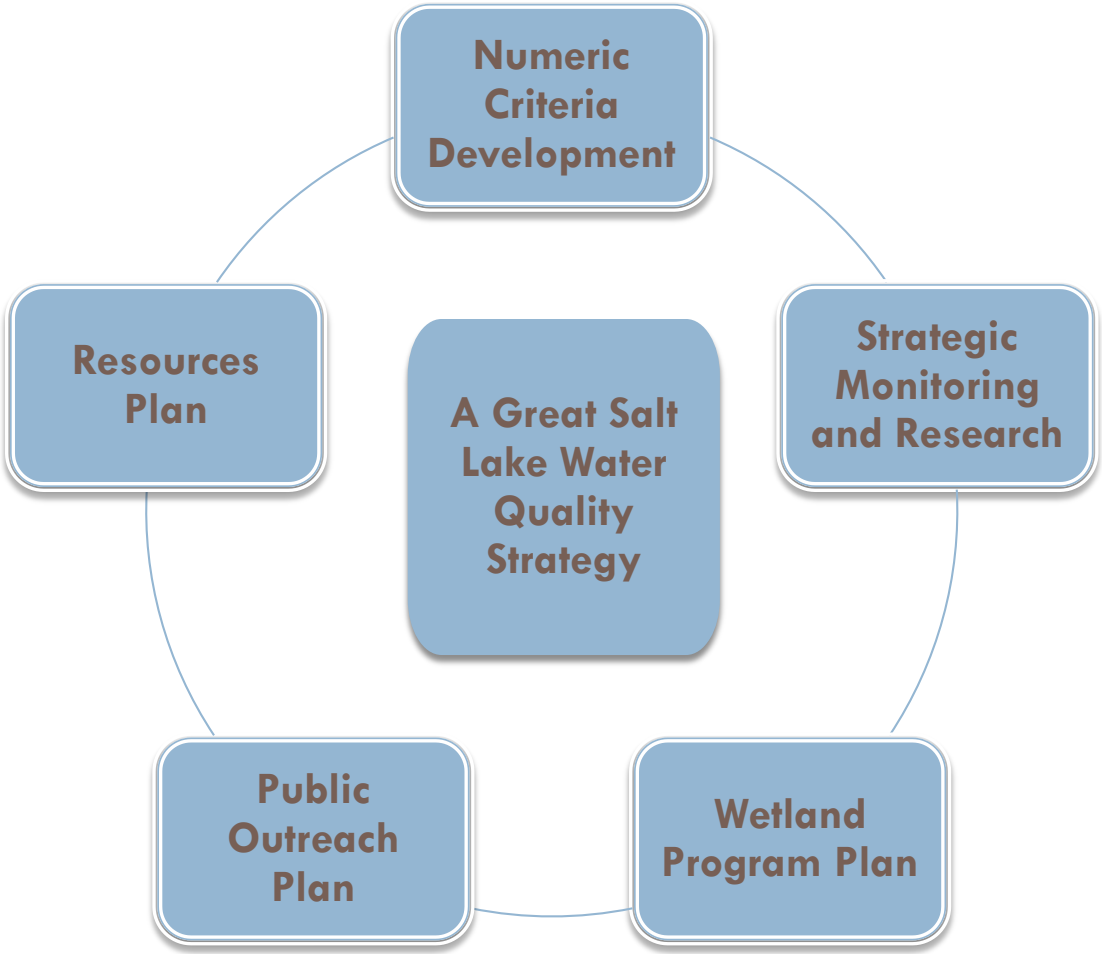
GREAT SALT LAKE: MERCURY RESEARCH

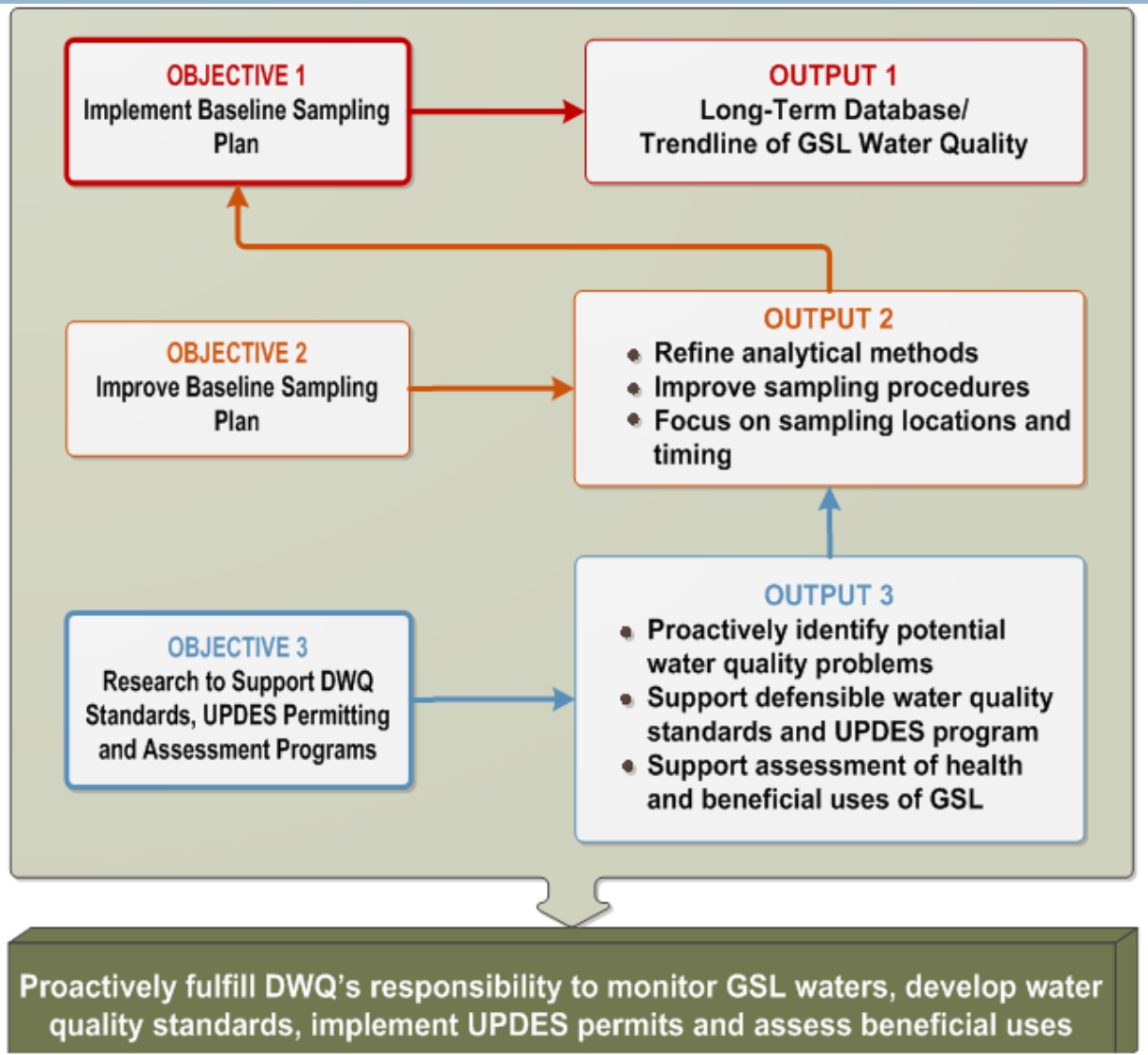
Photo courtesy of Charles Uibel, greatsaltlakephotos.com

Utah Department of Environmental Quality/ Division of Water Quality (UDWQ)

Great Salt Lake Water Quality Strategy



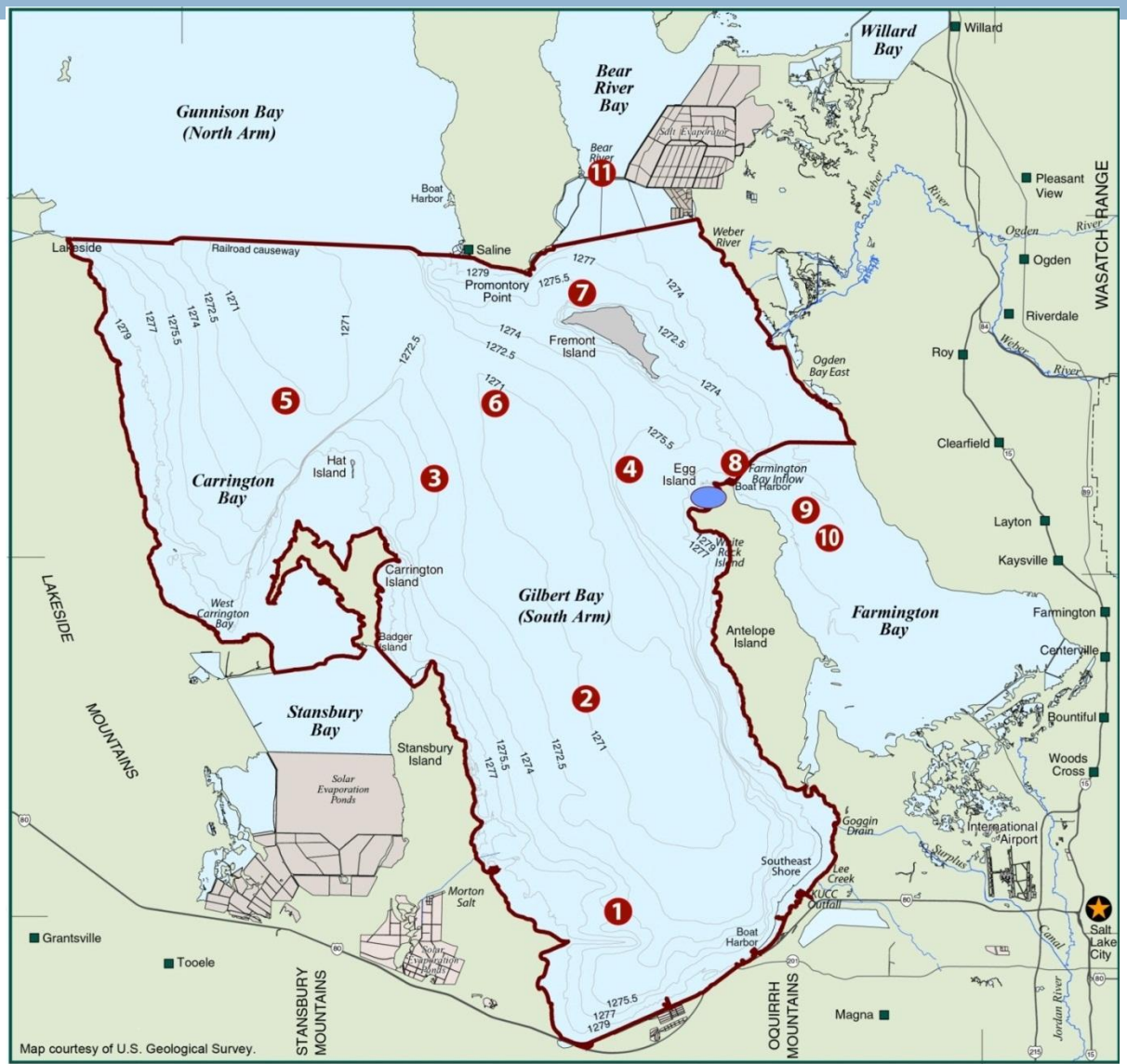
Strategic Monitoring and Research Plan



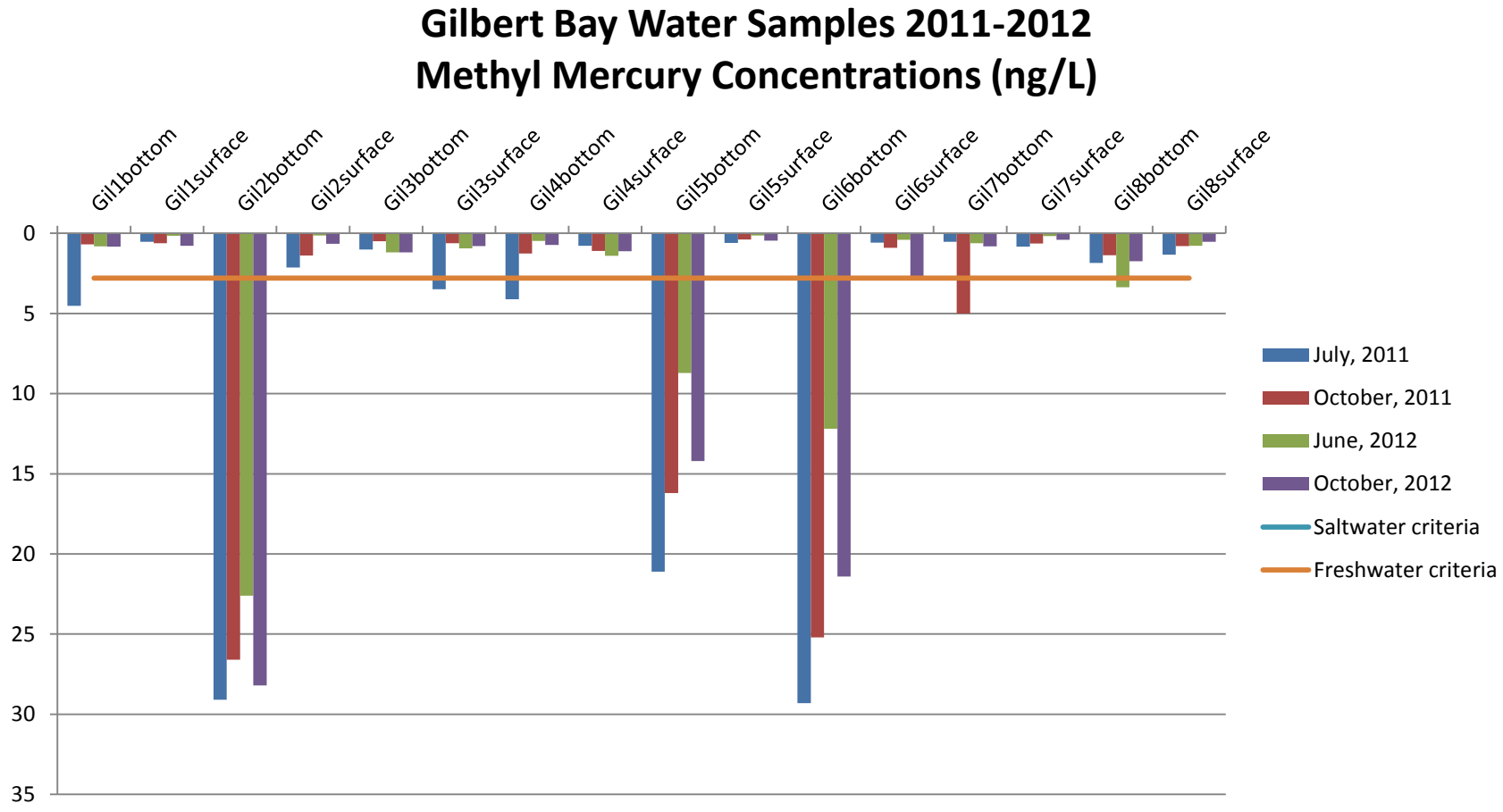
How are we going to use the data?

- Monitor the waters for the protection of the designated uses
- Prioritize pollutants for the development of numeric water quality criteria
- Ambient concentrations for the development of UPDES permits

UDWQ Monitoring Locations

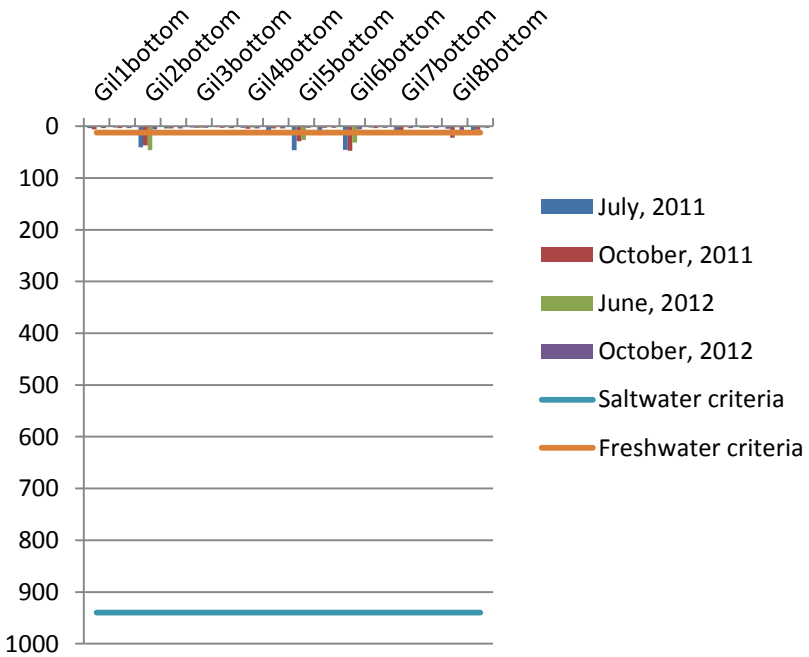


Methyl Mercury Concentrations in Gilbert Bay

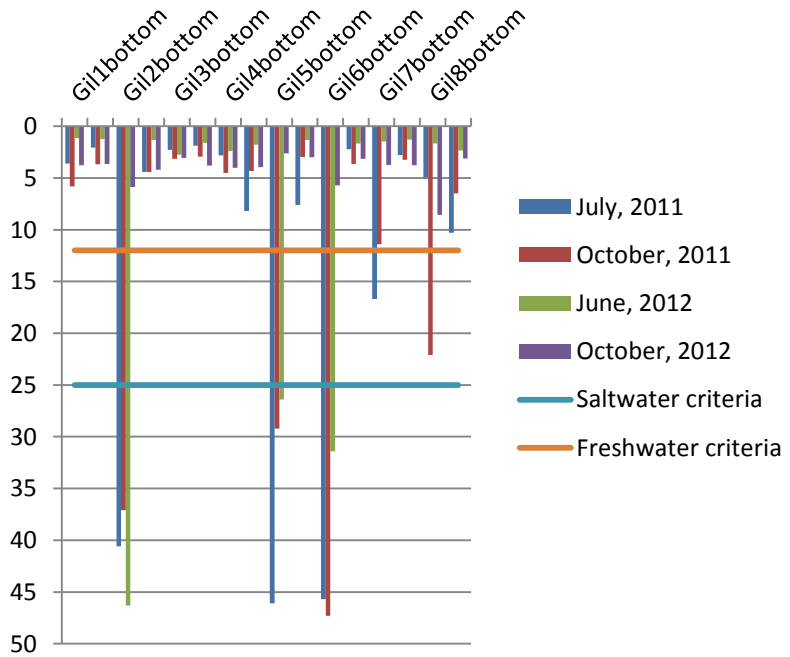


Total Mercury Concentrations in Gilbert Bay

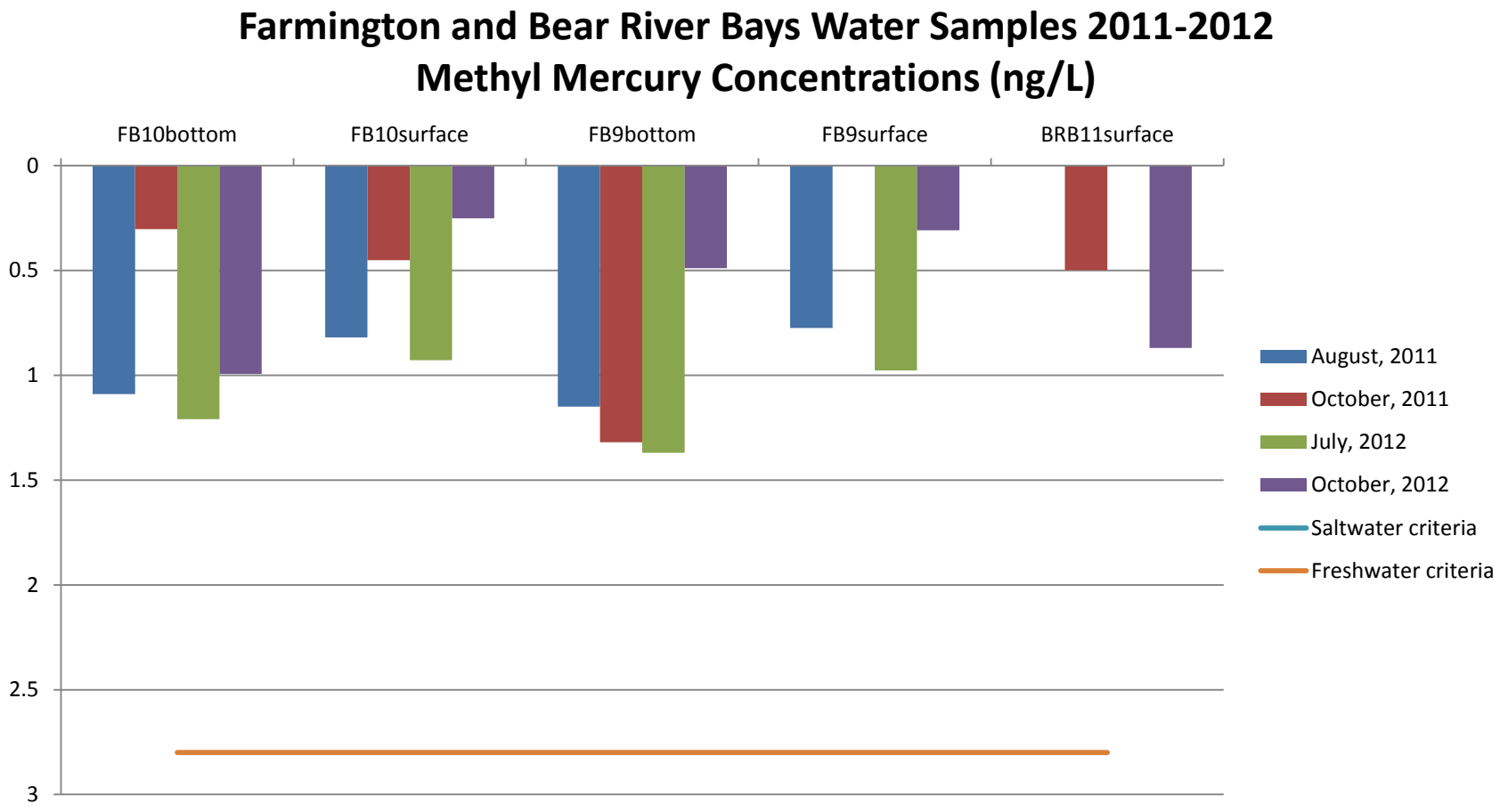
Gilbert Bay Water Samples 2011-2012
Total Mercury Concentrations (ng/L)



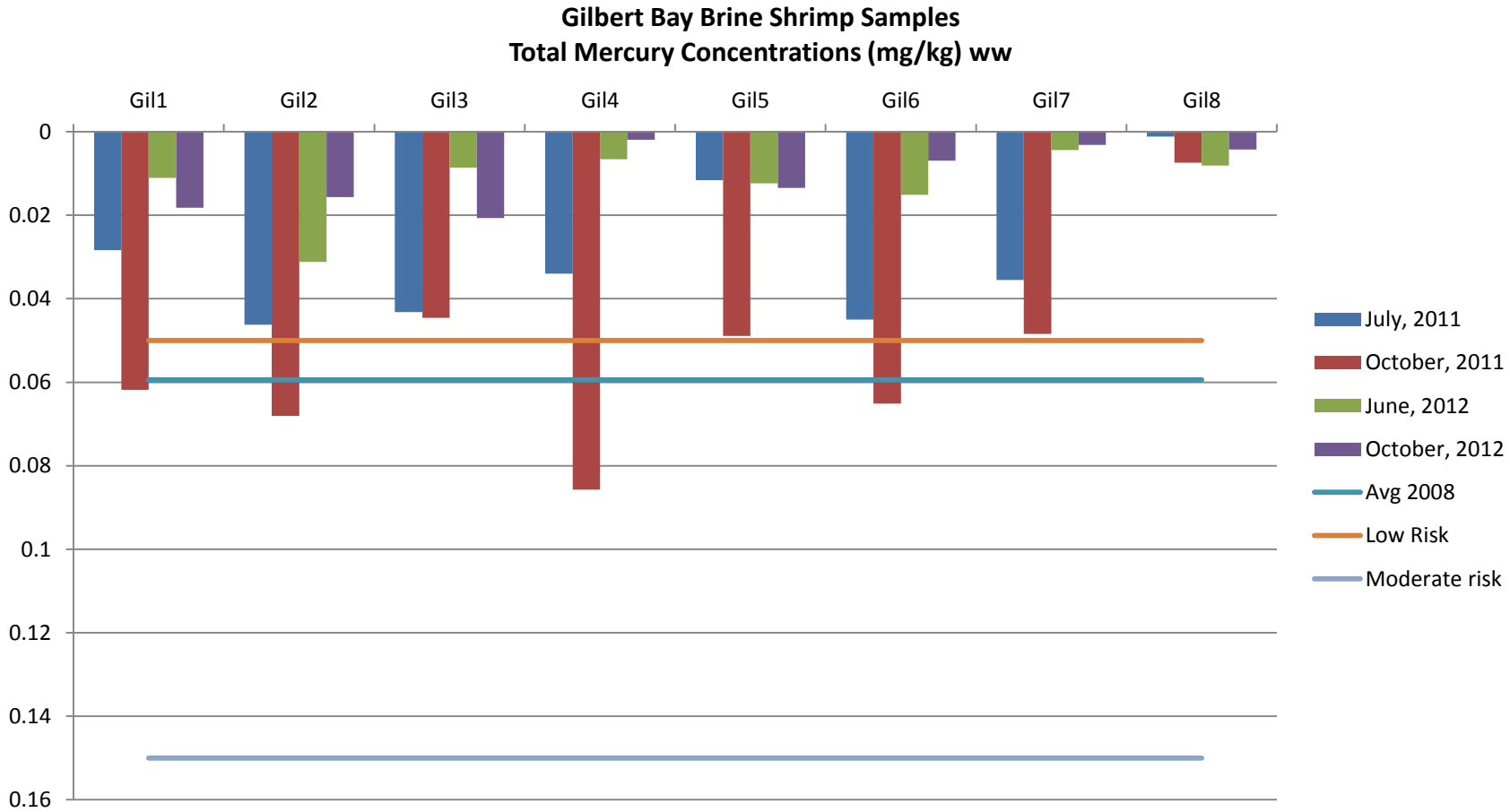
Gilbert Bay Water Samples 2011-2012
Total Mercury Concentrations (ng/L)



Methyl Mercury Concentrations in Farmington and Bear River Bays



Total Mercury Concentrations in Gilbert Bay Brine Shrimp



Toxicity Testing

- Objective : estimate range of chemical concentrations that produce observed quantifiable response under controlled lab conditions
- Test Organisms: Brine Shrimp and Brine Flies
- Researchers: Gary Belovsky and David Buchwalter
- Phases:
  - Acute Toxicity – short term exposure (4 days)
  - Chronic Toxicity – long term exposure

Pollutant Prioritization

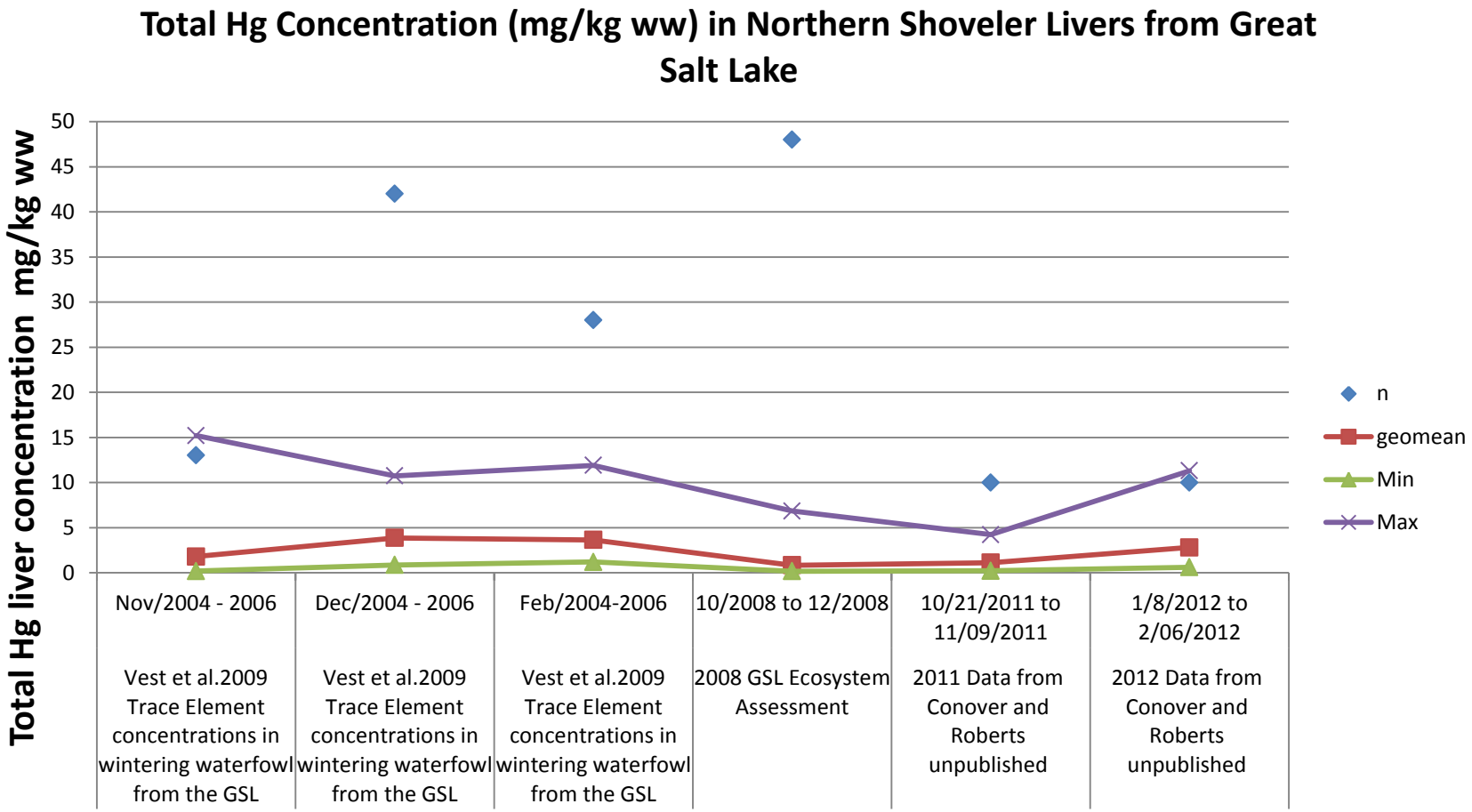
- Used only 2011-12 Baseline Sampling Data
- Shallow brine layer concentrations given greater weight than deep brine layer concentrations
- Mean concentrations were divided by 1) Utah's freshwater aquatic organism chronic criteria, 2) EPA's marine chronic criteria or 3)other benchmarks and ranked
- Further ranked by whether the pollutant is present in known discharges to GSL and by existing brine shrimp, brine fly toxicity studies

Pollutant Prioritization

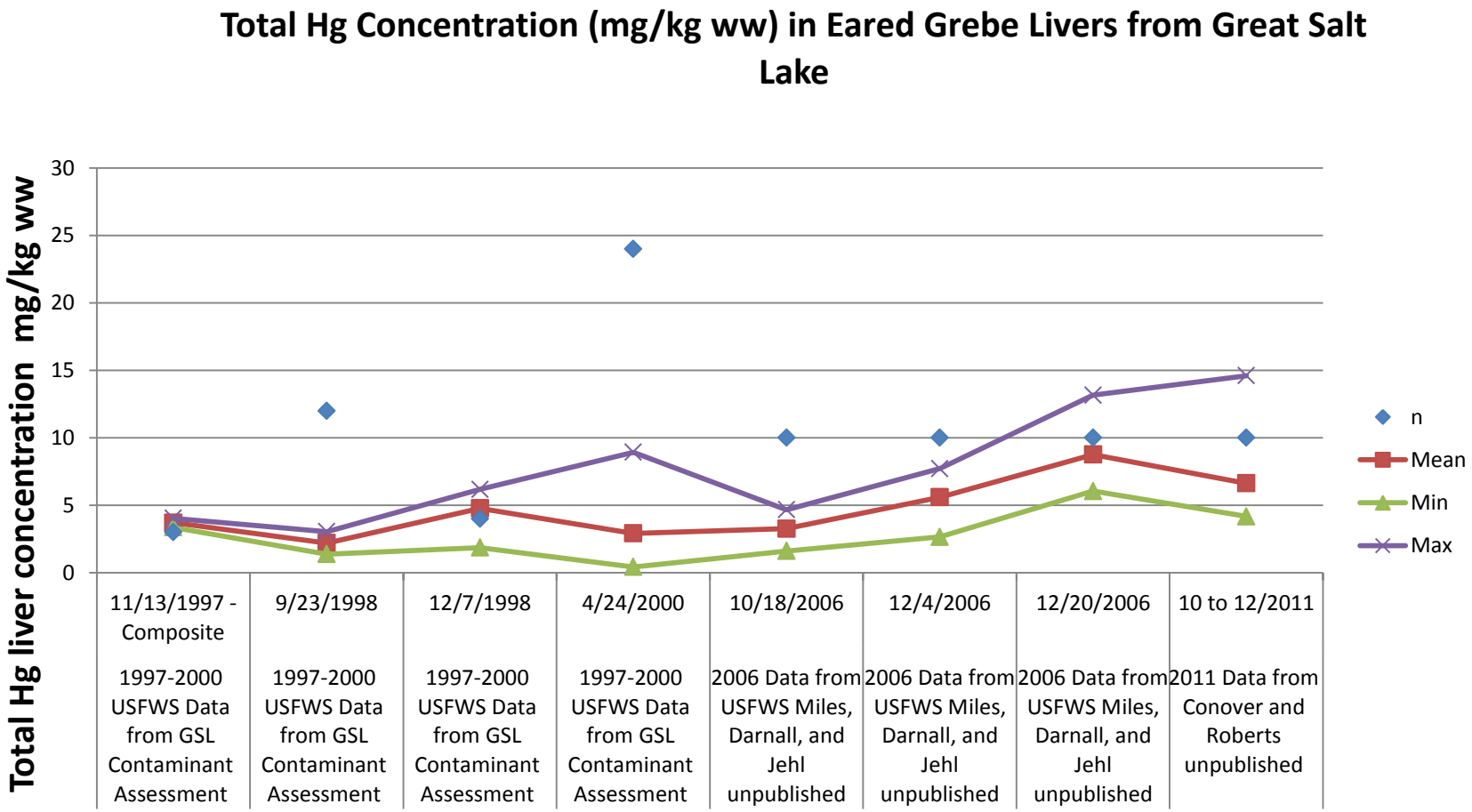
1. Arsenic
2. Copper
3. Methylmercury
4. Lead

- Deferred: ammonia, cadmium, total mercury, selenium, thallium, and zinc

Northern Shovelers Hg Liver Concentrations



Eared Grebe Hg Liver Concentrations



What Happens Next

- 2013
  - Continue Baseline Sampling Plan in partnership with USGS and Davis County Health Department
  - Implement year 1 of the Toxicological Testing
  - Implement Interim Permitting Approach
  - Adoption of GSL water quality strategy by the Water Quality Board
- 2014
  - Continued sampling
  - Year 2 of Toxicological Testing
  - Implement Laboratory Round Robin
  - Develop Core Components 4 (Public Outreach) and 5 (Resource)
  - Possible Ecological Risk Assessment – awaiting results from USGS/USFWS egg contaminant study

Contact Information

- The Great Salt Lake Water Quality Strategy can be accessed at http://www.waterquality.utah.gov/greatsaltlake/

- Call or contact me if you have any thoughts or questions about water quality on Great Salt Lake jgardberg@utah.gov

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